

Reconocimiento de Patrones

Version 2022-2

Características de Intensidad

[Capítulo 2]

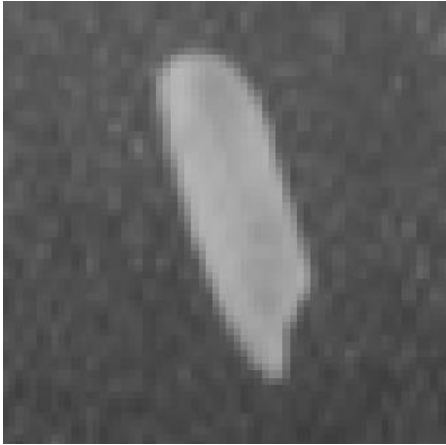
Dr. José Ramón Iglesias

DSP-ASIC BUILDER GROUP

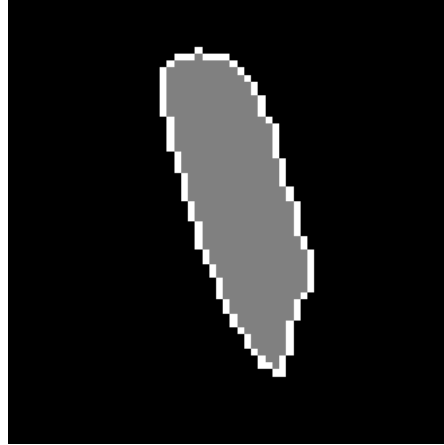
Director Semillero TRIAC

Ingeniería Electronica

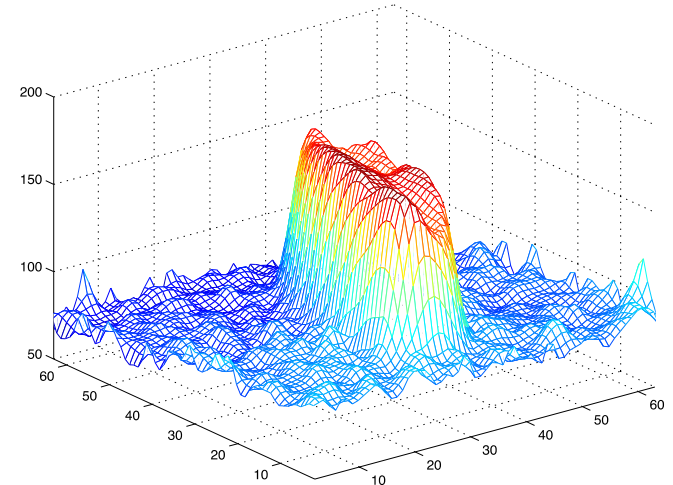
Universidad Popular del Cesar



a) Grayscale image



b) Segmentation



c) 3D representation of a)

There are two categories of features:

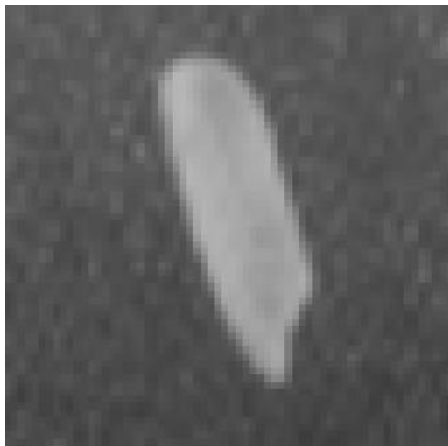
Geometric Features and
Intensity Features

Geometric Features give information about location, orientation, shape and size.

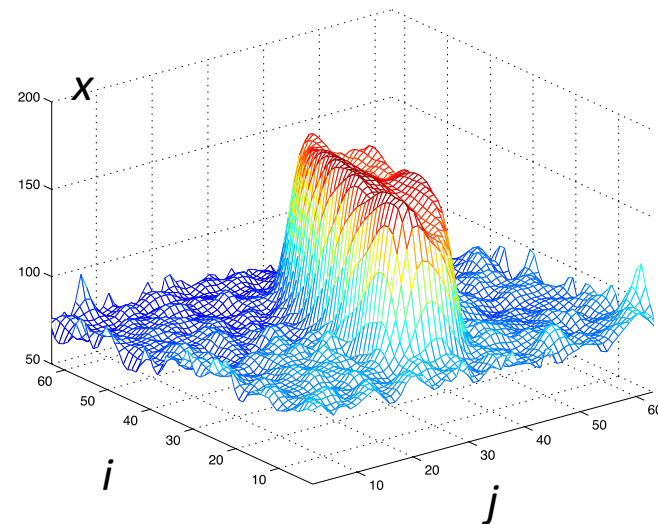
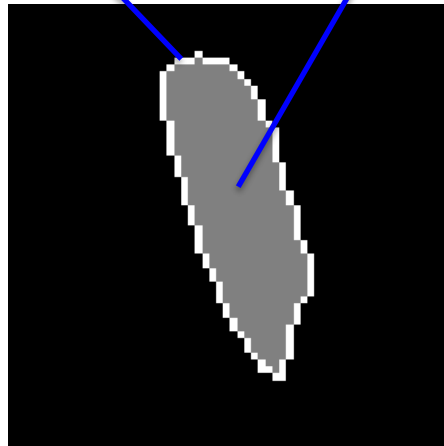
Intensity Features give information about how are the grayvalues.

Intensity Features

x



ℓ \mathcal{R}



Average

$$G = \frac{1}{A} \sum_{i,j \in \mathcal{R}} x[i, j]$$

Mean gradient

$$C = \frac{1}{L} \sum_{i,j \in \ell} x'[i, j]$$

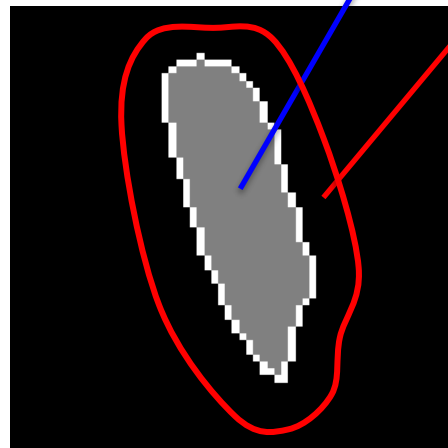
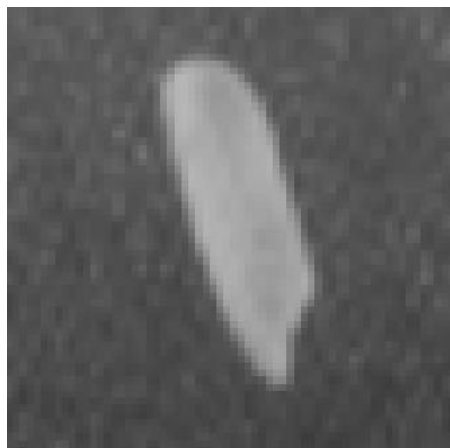
Mean 2nd gradient

$$D = \frac{1}{A} \sum_{i,j \in \mathcal{R}} x''[i, j]$$

Standard deviation, etc.

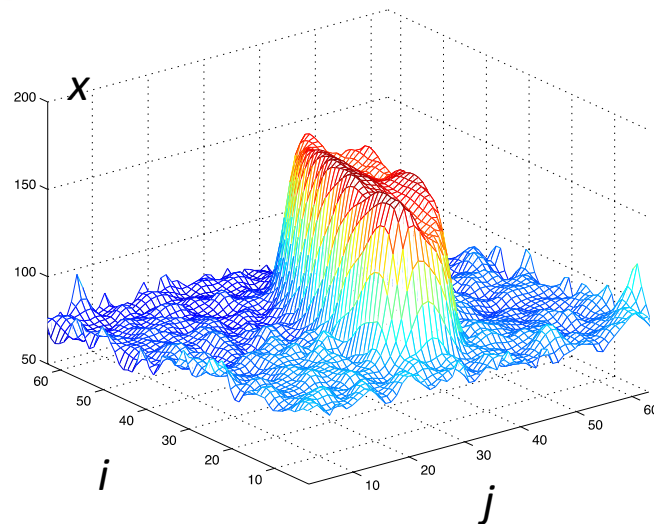
Contrast Features

x

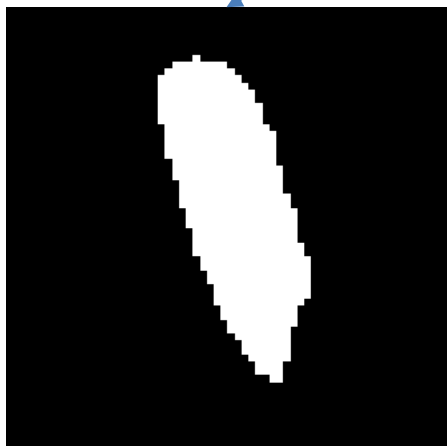


\mathcal{R}

\mathcal{R}_e



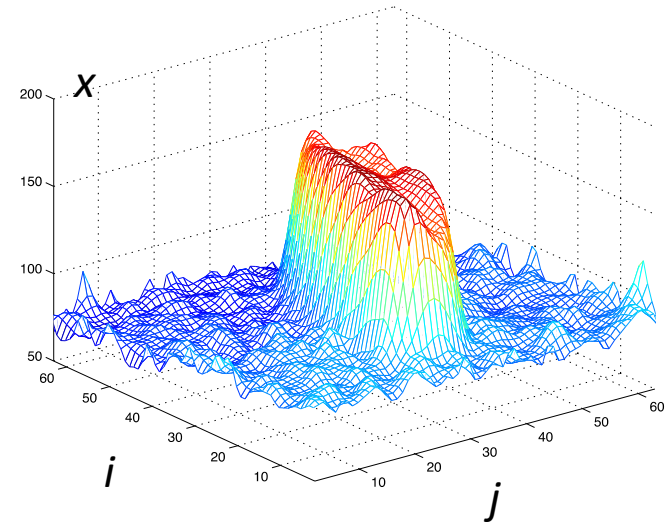
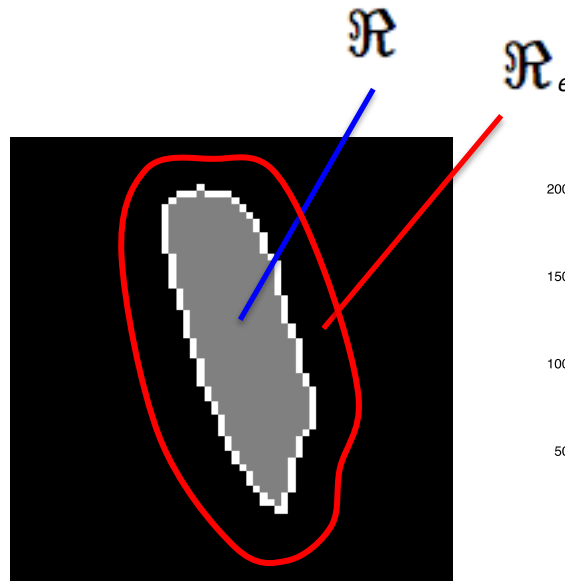
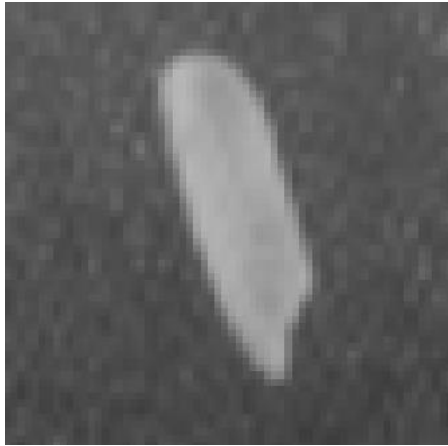
\mathcal{R}



\mathcal{R}_e

Contrast Features

x



Contrast

$$G = \frac{1}{A} \sum_{i,j \in \mathcal{R}} x[i, j] \quad G_e = \frac{1}{A_e} \sum_{i,j \in \mathcal{R}_e} x[i, j]$$

$$K_1 = \frac{G - G_e}{G_e} \quad K_2 = \frac{G - G_e}{G + G_e} \quad K_3 = \ln(G/G_e)$$

Contrast Features

```
I = imread('onerice.bmp');  
R = I>120;  
J = imdilate(R,ones(11,11));  
Re = and(not(R),J);  
i = find(R==1);  
ie = find(Re==1);  
G = mean(I(i));  
Ge = mean(I(ie));
```

```
K1 = abs(G-Ge)/Ge      % 0.85  
K2 = abs(G-Ge)/(G+Ge)  % 0.30  
K3 = log(G/Ge)         % 0.62
```

